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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/563,284

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Makoto Nakashizuka

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EXAMINER

SHIKHMAN, MAX

ART UNIT

PAPER NUMBER

2624

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/563,284	Applicant(s) NAKASHIZUKA ET AL.	
	Examiner MAX SHIKHMAN	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08/14/2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,9-11,14 and 15 is/are rejected.
- 7) ☒ Claim(s) 3-8,12 and 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01/03/2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/12/2006, 01/03/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims **1,11,14,15; 9,10** rejected under 35 U.S.C. 102(b) as being anticipated by Ramponi “Nonlinear unsharp masking methods for image contrast enhancement”, J. Electron. Imaging, Vol. 5, 353 (1996).

() Regarding Claims 1,11,14,15:

(NOTE: filter=Fig4, “Laplacian”. Mask is

$z1$	$z2$	$z3$
$z4$	$z5$	$z6$
$z7$	$z8$	$z9$

 $Sobel = \sqrt{Gx^2 + Gy^2}$

deriving section=Fig4, Sobel.

Sobel is $Gy=[z3-z1+2(z6-z4)+z9-z7]^2 =$

$(z3-z1)^2+2(z3-z1)*2(z6-z4)(z9-z7) +\{2(z6-z4)*(z9-z7)\}^2$.

Thus, discrete wavelet conversion= Fig4, Sobel, since Applicant’s DWT in Spec P11 as

$Wf_1(n) = x(n-1)-x(n+1)=z6-z4$.

first conversion coefficient= $z3-z1$.

second conversion coefficient= $2(z6-z4)+z9-z7$.

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square of the first conversion coefficient= $(z3-z1)^2$.

product of the first and second conversion coefficients= $2(z3-z1)*2(z6-z4)(z9-z7)$

predetermined setting value=2

different magnitude relationships= $z3-z1$ and $2(z6-z4)+z9-z7$ are different.

adding section=Fig4, \oplus . multiplying section=Fig4, \otimes)

1. An image processing apparatus for removing noise of an input image and for emphasizing contrast of a contour portion, comprising:

a filter for passing a high-frequency component of input image data therethrough;
(Fig4, "Laplacian")

a deriving section (Fig4, Sobel) for obtaining first and second conversion coefficients having different magnitude relationships between an image contour portion and noise by subjecting the input image data to discrete wavelet conversion (Fig4, Sobel) and for obtaining an emphasis control amount based on the square of the first conversion coefficient, the product of the first and second conversion coefficients, and a predetermined setting value (2);

a multiplying section (Fig4, \otimes) for outputting the product of the emphasis control amount sent from the deriving section (Fig4, Sobel) and an output of the filter; and (Fig4, "Laplacian")

an adding section (Fig4, \oplus) for obtaining output image data (Fig4, Enhanced Output Image) by adding (Fig4, \oplus) the product output from the multiplying section (Fig4, \otimes) and the input image data. (Fig4, Input Image)

() Regarding Claim 9:

9. An image processing apparatus according to claim 1, wherein the deriving section further comprises a limiter for limiting a numerical range of a calculated linear sum. (Fig4, Sobel.)

() Regarding Claim 10:

10. An image processing apparatus according to claim 1, further comprising an amplifying section for determining a degree of emphasis by multiplying an output of the multiplying section by a constant (λ) and outputting the product to the adding section.
(Fig4, \otimes . λ)

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 2 rejected under 35 U.S.C. 103(a) as being unpatentable over Ramponi "Nonlinear unsharp masking methods for image contrast enhancement" in view of Maurer US-PAT-NO: 6665448.

() Regarding Claim 2:

Ramponi discloses, P353 col2, *"for small input amplitude changes, which can be reasonably interpreted as noise, the lowpass linear component dominates and a smoothing effect is obtained; whereas large input variations representing relevant*

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details and captured by the highpass component are further amplified due to the cubic term." Ramponi does not disclose, An image processing apparatus according to claim 1, wherein the deriving section outputs a negative value for image flat portion to cause the adding section to subtract high-frequency component from the input image data, and the deriving section outputs a positive value for the image contour portion to cause the adding section to add the high frequency component to the input image data.

Maurer discloses this in Col2 lines 1-3, "by modifying the local "sharpness gain factor" $\lambda(i,j)$ such that it has positive values (sharpening) in activity regions but negative values (smoothing) in flat regions." As Maurer discloses, it is desirable to use a negative value for smooth flat regions to de-noise the image, and it is desirable to use a positive value to sharpen the image. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention, to use Maurer's method in Ramponi, let λ be negative in flat regions and let λ be positive in non-flat portions, to highlight edges and smooth noise.

Allowable Subject Matter

5. Claims 3-8,12,13 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 3,12,13 would be allowable because the prior art does not disclose, "a setting section for calculating and outputting a linear sum of a value obtained by multiplying an output of the first circuit by predetermined .alpha., a value obtained by multiplying an output of the second circuit by predetermined .beta., and the value of predetermined .gamma..".

Claims 4-7 depend on Claim 3 and would thus be allowable.

Claim 8 would be allowable because the prior art does not disclose, "the discrete wavelet conversion section comprising: a first high-pass filter for carrying out one-dimensional filter processing of each line in a horizontal direction of the input image data to output the first conversion coefficient in the horizontal direction; a second high-pass filter for carrying out one-dimensional filter processing of each line in a vertical direction of the input image data to output the first conversion coefficient in the vertical direction; a low-pass filter for carrying out filter processing of each line in the horizontal direction and for carrying out filter processing of each line in the vertical direction of the input image data; a third high-pass filter for carrying out one-dimensional filter processing of each line in the horizontal direction of an output from the low-pass filter to output the second conversion coefficient in the horizontal direction; and a fourth high-pass filter for carrying out one-dimensional filter processing of each line in the vertical direction of the output from the low-pass filter to output the second conversion coefficient in the vertical direction."

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MAX SHIKHMAN whose telephone number is (571)270-1669. The examiner can normally be reached on Monday-Friday 8:30AM-6:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JINGGE WU can be reached on (571) 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jingge Wu/
Supervisory Patent Examiner, Art Unit 2624

/Max Shikhman/
Examiner, Art Unit 2624
9.21.2008